

Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505
OCT 30 2017
RECEIVED

Form C-103
Revised July 18, 2013

SUNDRY NOTICES AND REPORTS ON WELLS (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)		WELL API NO. 30-015-44097
1. Type of Well: Oil Well ☒ Gas Well ☐ Other ☐		5. Indicate Type of Lease STATE ☒ FEE ☐
2. Name of Operator DEVON ENERGY PRODUCTION CO., LP		6. State Oil & Gas Lease No.
3. Address of Operator 333 WEST SHERIDAN AVE., OKC, OK 73102		7. Lease Name or Unit Agreement Name Emerald PWU 20 22
4. Well Location Unit Letter <u>M</u> : <u>15</u> feet from the <u>South</u> line and <u>265</u> feet from the <u>WEST</u> line Section <u>20</u> Township <u>19S</u> Range <u>29E</u> NMPM Eddy, County		8. Well Number <u>12H</u>
11. Elevation (Show whether DR, RKB, RT, GR, etc.) 3313.8'		9. OGRID Number 6137
		10. Pool name or Wildcat (98199) Parkway; Bone Spring, West

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐
TEMPORARILY ABANDON ☐ CHANGE PLANS ☐
PULL OR ALTER CASING ☐ MULTIPLE COMPL ☐
DOWNHOLE COMMINGLE ☐
CLOSED-LOOP SYSTEM ☐
OTHER: ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐ ALTERING CASING ☐
COMMENCE DRILLING OPNS. ☐ P AND A ☐
CASING/CEMENT JOB ☐
OTHER: Drilling Operation Changes ☒

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Per discussion with Mr. Podany, Devon Energy Production Co., L.P. respectfully submits the summary of work conducted at the Emerald PWU 20-22 12H

ATTACHMENTS: Remediation Procedures Completed, Wellbore Diagram, Directional Survey

Spud Date:

Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Erin Workman TITLE Regulatory Compliance Analyst DATE 10/30/17

Type or print name Erin Workman E-mail address: Erin.workman@dmv.com PHONE: (405) 552-7970
For State Use Only

APPROVED BY: Raymond Podany TITLE Geologist DATE 10-30-17
Conditions of Approval (if any):

Emerald PWU 20-21 12H

Remediation Procedures Completed:

- 8/30 – Unsuccessful cement job: while mixing tail cement, casing became plugged with debris. As a result, the entire production casing string remained full of tail cement.
 - Calculated top of tail cement in the annulus is 18,823' MD,
 - Estimated top of lead cement in annulus: 9,700' MD
- 8/31 – Begin cleanout run with tubing to drill out cement to a depth of 10,400' MD
- 9/3 – Cement successfully drilled out to 10,400' MD, BHA successfully pulled out of hole, rig released at 13:00 to drill Onyx PWU 29-28 9H
- 9/15 – Conducted cement evaluation logging run with isolation scanner log.
 - Estimated top of lead cement from logging evaluation: 9,700' MD
- 9/22 – Skid rig from Onyx PWU 29-28 9H to Emerald PWU 20-22 12H
- Cut casing 5.5" casing at 8344' MD, pull casing out of the hole
- Set whipstock at 8050'
- Set 500' cement plug below whipstock
- Re-drill curve / lateral
- Run 5.5" 17 PPF P-110 CDC HTQ production casing
- Cement production casing

**Emerald 12 20-22 12H - RE**

County Eddy

Rig Cactus 167

API

WBS

Surface
Fresh Water
8.4 - 8.6 PPG

Intermediate
Brine
9.8 - 10.0 PPG
28 FV
NC API FL

Top of Salt	439	461
Base of Salt	900	2020
Delaware	2920	1600
Bone Spring	4520	2232
1BSSS	6752	139
2BLSUM	6891	595
2BSSS	7486	356
3BLSUM	7842	767
3BSSS	8609	322
G Sand Target	8931	75
WFMP	9006	

Hole: 20
MD: 200

Hole: 12.25
MD: 3,409

Casing Program:							
Section	Size	Weight	Grade	Conn	Top	Shoe (APD)	Shoe (Plan)
Surface	13 3/8	54.5	J-55	BTC	0		200
Intermediate	9 5/8	36	J-55	LTC	0		3,409
Production	5 1/2	17	P110RY	CDC HTO	0		21,665

Casing Mechanical Specifications:								
Size	Collapse	Burst	Jt Yield	Min	Opt	Max	ID	Drift
13 3/8	1130	2740	853		13380		12.615	12.459
9 5/8	2020	3520		2718	3624	4530	8.921	8.765
5 1/2	7460	10640	568	10000	12500	14000	4.892	4.767

Cementing Program:								
Section	Slurry	Top	Sacks	Gauge Vol (BBL)	Excess Vol (BBL)	Tot Vol w/ Excess (BBL)	Density (PPG)	Excess
Surface	Tail	Surf	226.7	43.0	53.7	53.7	14.8	25%
Inter	Lead	Surf	985.0	136.1	340.4	451.9	12.6	150%
	Tail	2409.0	471.0	55.8	111.6		14.8	100%
Prod	Lead	0.0	919.0	385.4	423.9	1026.6	11.2	10%
	Tail	8344.0	2867.6	547.9	602.7		14.5	10%

*Cement volumes are rough estimates. Use volumes provided in cement proposals

Whipstock:
8050' MD
500' Cement plug
below whip

KOP:
MD 8,344
TVD 8,320

Casing Cut:
8344' MD

Prod Curve
Cut Brine
8.4 - 9.0 PPG
28 FV
NC API FL

Production Lateral
Cut Brine
8.4 - 9.0 PPG
35 FV
15 API FL

LP:
MD 9,392
TVD 8,965

TD:
MD 21,665
TVD 9,050

Hole Size (Int CSG - LP): 8.75

Hole Size (LP - TD): 8.5

1
1

1
1

Devon Energy

Project: Eddy County, NM (NAD-83)
Site: Emerald PWU 20-22
Well: 12H
Wellbore: ST01
Design: Plan #4

3313.8' GE + 23.5' KB @ 3337.30usft
Ground Level: 3313.80



Azimuths to Grid North
True North: -0.12°
Magnetic North: 7.29°
Magnetic Field
Strength: 48176.8nT
Dip Angle: 60.50°
Date: 9/8/2017
Model: HDGM

PROJECT DETAILS: Eddy County, NM (NAD-83)

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone

Datum: 3313.8' GE + 23.5' KB @ 3337.30usft

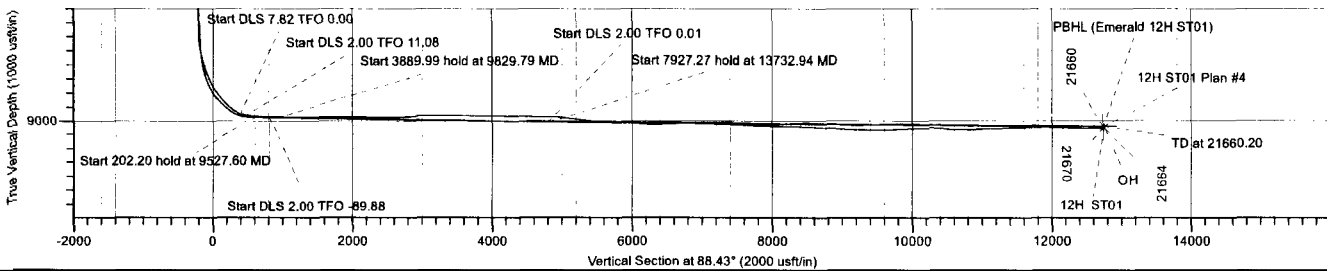
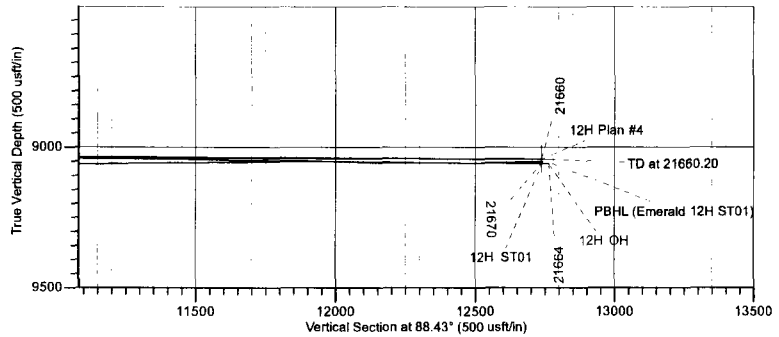
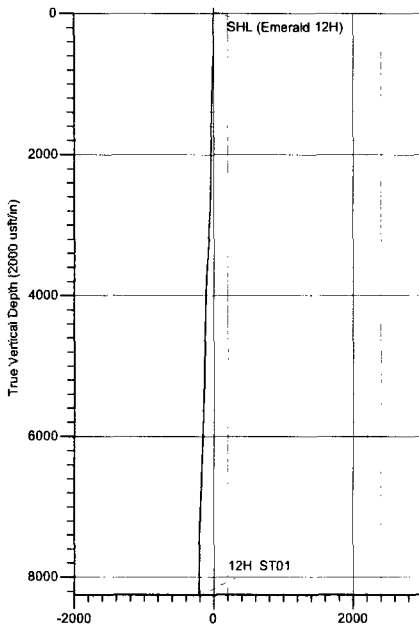


SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec
1	9300.00	81.44	91.36	8956.50	364.85	373.32	0.00	0.00	383.17
2	9381.00	86.21	91.36	8963.06	363.41	433.93	7.82	0.00	443.72
3	9527.60	89.48	92.00	8969.32	358.53	600.31	2.00	11.08	609.91
4	9729.80	89.48	92.00	8971.16	351.47	802.38	0.00	0.00	811.71
5	9830.00	89.49	90.00	8972.06	349.72	902.56	2.00	-89.86	911.80
6	13719.81	89.49	90.00	9007.00	350.00	4792.21	0.00	0.00	4800.00
7	13732.92	89.75	90.00	9007.09	350.00	4805.33	2.00	0.89	4813.11
8	21660.22	89.75	90.00	9042.00	350.00	12732.55	0.00	0.00	12737.36

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
PBHL (Emerald 12H ST01)	9042.00	350.00	12732.55	32° 38' 24.1660 N	104° 3' 48.1410 W
SHL (Emerald 12H)	0.00	0.00	0.00	32° 38' 20.9983 N	104° 6' 17.0598 W



LEAM DRILLING SYSTEMS LLC
2010 East Davis, Conroe, Texas 77301
Phone: 936/756-7577, Fax: 936/756-7595

Plan: Plan #4 (12H-ST01)
Emerald PWU 20-22
Created By: Dustin Ault
Date: 8-17, October 19 2017
Approved: _____
Date: _____

Devon Energy

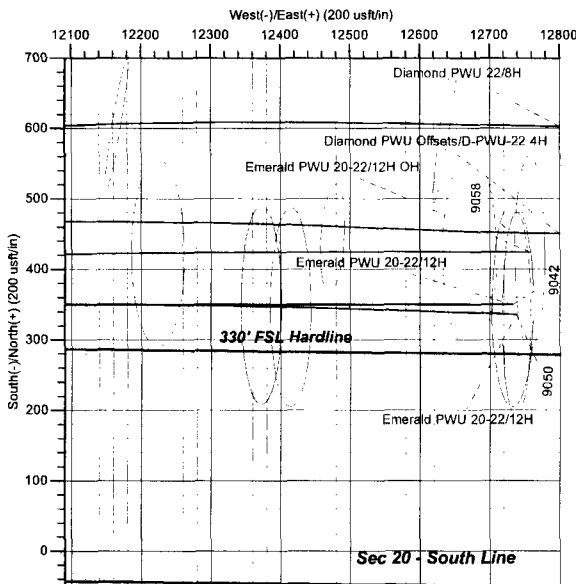
Project: Eddy County, NM (NAD-83)
Site: Emerald PWU 20-22
Well: 12H
Wellbore: ST01
Design: Plan #4



Azimuths to Grid North
True North: -0.12°
Magnetic North: 7.29°

Magnetic Field
Strength: 48176.8nT
Dip Angle: 60.50°
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Zone: New Mexico Eastern Zone

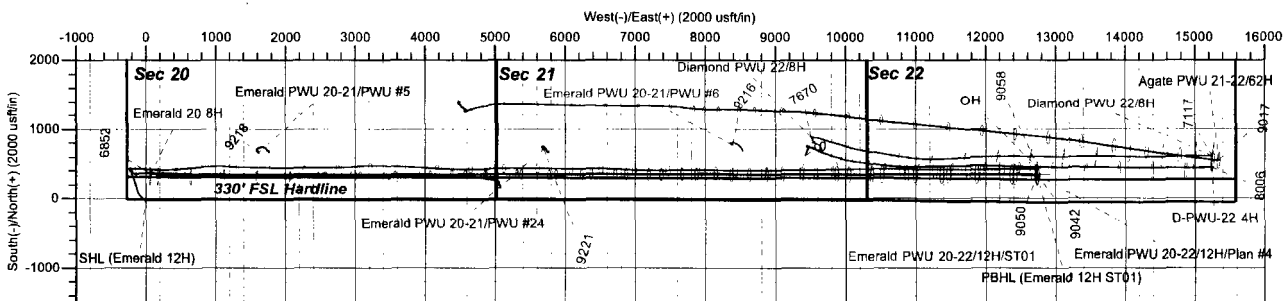


DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL (Emerald 12H)	0.00	0.00	0.00	596335.26	611703.17	32° 38' 20.9983 N	104° 6' 17.0598 W
PBHL (Emerald 12H ST01)	9042.00	350.00	12732.55	596685.26	624435.72	32° 38' 24.1660 N	104° 3' 48.1410 W

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect
9300.00	81.44	91.36	8956.50	364.85	373.32	0.00	0.00	383.17
9361.00	86.21	91.36	8963.06	363.41	433.93	7.82	0.00	443.72
9527.80	89.48	92.00	8969.32	358.53	600.31	2.00	11.08	609.91
9729.80	89.48	92.00	8971.16	351.47	802.38	0.00	0.00	811.71
9830.00	89.49	90.00	8972.06	349.72	902.56	2.00	-89.86	911.80
13719.81	89.49	90.00	9007.00	350.00	4792.21	0.00	0.00	4800.00
13732.92	89.75	90.00	9007.09	350.00	4805.33	2.00	0.89	4813.11
21660.22	89.75	90.00	9042.00	350.00	12732.55	0.00	0.00	12737.36



LEAM DRILLING SYSTEMS LLC
2010 East Davis, Conroe, Texas 77301
Phone: 936/756-7577, Fax 936/756-7595

Plan: Plan #4 (12H/ST01)
Emerald PWU 20-22
Created By: Dustin Ault
Date: 8/19, October 19 2017
Approved: _____
Date: _____

NM OIL CONSERVATION
ARTESIA DISTRICT

OCT 30 2017

RECEIVED

Devon Energy

Eddy County, NM (NAD-83)

Emerald PWU 20-22

12H

ST01

Design: ST01

Standard Survey Report

19 October, 2017

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Coordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Site:	Emerald PWU 20-22	MD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Well:	12H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	Database:	EDM 5000.1 Multi User Db

Project:	Eddy County, NM (NAD-83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site		Emerald PWU 20-22			
Site Position:		Northing:	596,335.26 usft	Latitude:	32° 38' 20.9983 N
From:	Map	Easting:	611,703.17 usft	Longitude:	104° 6' 17.0598 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.12 °

Well	12H					
Well Position	+N/-S	0.00 usft	Northing:	596,335.26 usft	Latitude:	32° 38' 20.9983 N
	+E/-W	0.00 usft	Easting:	611,703.17 usft	Longitude:	104° 6' 17.0598 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,313.80 usft

Wellbore	ST01				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	9/8/2017	7.42	60.50	48,177

Design:	ST01				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	8,033.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	88.43	

Survey Program		Date	10/19/2017	
From (usft)	To (usft)	Survey Wellbore	Tool Name	Description
50.00	150.00	Survey #1 (OH)	VES GyroFlex V2	
285.00	8,033.00	Survey #2 (OH)	LEAM MWD+HDGM	MWD+HDGM
8,119.00	21,600.00	Survey #1 - MWD (ST01)	MWD+IFR1+MS	MWD + IFR1 + Multi-Station Correction
21,670.00	21,670.00	Survey #2 (ST01)	Project	Projection

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SHL (Emerald 12H)									
50.00	0.09	354.90	50.00	0.04	0.00	0.00	0.18	0.18	0.00
100.00	0.29	335.65	100.00	0.19	-0.06	-0.05	0.41	0.40	-38.50
150.00	0.57	324.69	150.00	0.51	-0.26	-0.24	0.58	0.56	-21.92
285.00	1.50	247.30	284.98	0.38	-2.27	-2.26	1.10	0.69	-57.33
338.00	1.50	253.60	337.96	-0.09	-3.58	-3.58	0.31	0.00	11.89
438.00	1.80	251.50	437.92	-0.95	-6.32	-6.35	0.31	0.30	-2.10

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Coordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Site:	Emerald PWU 20-22	MD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Well:	12H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Depth Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
529.00	1.90	260.30	528.87	-1.66	-9.17	-9.21	0.33	0.11	9.67
620.00	1.90	257.60	619.82	-2.24	-12.13	-12.18	0.10	0.00	-2.97
711.00	1.80	254.60	710.77	-2.94	-14.98	-15.05	0.15	-0.11	-3.30
803.00	1.80	254.60	802.73	-3.71	-17.76	-17.86	0.00	0.00	0.00
894.00	1.70	267.10	893.69	-4.16	-20.49	-20.60	0.43	-0.11	13.74
985.00	1.50	262.90	984.65	-4.37	-23.02	-23.13	0.25	-0.22	-4.62
1,077.00	1.40	260.80	1,076.62	-4.70	-25.32	-25.44	0.12	-0.11	-2.28
1,169.00	1.40	253.10	1,168.60	-5.21	-27.51	-27.64	0.20	0.00	-8.37
1,261.00	1.50	257.80	1,260.57	-5.79	-29.76	-29.91	0.17	0.11	5.11
1,353.00	0.80	280.10	1,352.55	-5.93	-31.57	-31.72	0.89	-0.76	24.24
1,449.00	0.50	270.50	1,448.54	-5.81	-32.65	-32.80	0.33	-0.31	-10.00
1,544.00	0.90	277.10	1,543.53	-5.71	-33.80	-33.95	0.43	0.42	6.95
1,640.00	0.70	269.00	1,639.52	-5.63	-35.14	-35.28	0.24	-0.21	-8.44
1,736.00	0.90	276.60	1,735.51	-5.56	-36.47	-36.61	0.24	0.21	7.92
1,831.00	0.70	294.20	1,830.51	-5.23	-37.74	-37.87	0.33	-0.21	18.53
1,927.00	1.10	282.80	1,926.49	-4.79	-39.18	-39.29	0.45	0.42	-11.88
2,022.00	0.70	308.20	2,021.48	-4.23	-40.52	-40.62	0.58	-0.42	26.74
2,118.00	0.40	293.50	2,117.48	-3.73	-41.29	-41.38	0.34	-0.31	-15.31
2,214.00	0.40	295.90	2,213.48	-3.45	-41.90	-41.98	0.02	0.00	2.50
2,310.00	0.60	324.20	2,309.47	-2.90	-42.50	-42.56	0.33	0.21	29.48
2,405.00	0.70	289.40	2,404.47	-2.30	-43.33	-43.38	0.42	0.11	-36.63
2,501.00	1.10	317.20	2,500.45	-1.43	-44.51	-44.54	0.61	0.42	28.96
2,596.00	1.50	318.10	2,595.43	0.17	-45.96	-45.94	0.42	0.42	0.95
2,724.00	3.00	318.10	2,723.33	3.91	-49.32	-49.19	1.17	1.17	0.00
2,788.00	3.30	322.10	2,787.23	6.61	-51.57	-51.37	0.58	0.47	6.25
2,883.00	3.80	319.30	2,882.05	11.15	-55.30	-54.97	0.56	0.53	-2.95
2,979.00	4.60	321.30	2,977.79	16.57	-59.78	-59.31	0.85	0.83	2.08
3,074.00	5.10	319.80	3,072.45	22.76	-64.89	-64.24	0.54	0.53	-1.58
3,170.00	5.70	322.80	3,168.02	29.82	-70.53	-69.68	0.69	0.63	3.13
3,265.00	6.10	320.70	3,262.52	37.49	-76.58	-75.52	0.48	0.42	-2.21
3,361.00	6.20	320.40	3,357.97	45.43	-83.11	-81.84	0.11	0.10	-0.31
3,406.00	6.10	320.20	3,402.71	49.14	-86.19	-84.81	0.23	-0.22	-0.44
3,543.00	6.10	319.00	3,538.93	60.22	-95.63	-93.94	0.09	0.00	-0.88
3,639.00	5.40	325.60	3,634.45	67.80	-101.52	-99.63	1.00	-0.73	6.88
3,734.00	5.30	337.10	3,729.04	75.53	-105.76	-103.65	1.13	-0.11	12.11
3,830.00	5.20	335.80	3,824.64	83.58	-109.27	-106.93	0.16	-0.10	-1.35
3,925.00	4.80	342.70	3,919.28	91.30	-112.21	-109.67	0.76	-0.42	7.26
4,021.00	4.50	343.20	4,014.96	98.74	-114.49	-111.75	0.32	-0.31	0.52
4,116.00	4.60	345.70	4,109.66	106.00	-116.51	-113.57	0.23	0.11	2.63
4,212.00	5.20	348.30	4,205.31	113.99	-118.35	-115.18	0.67	0.63	2.71
4,307.00	6.20	345.00	4,299.84	123.16	-120.55	-117.13	1.11	1.05	-3.47
4,403.00	5.80	351.00	4,395.31	132.96	-122.65	-118.96	0.77	-0.42	6.25
4,498.00	5.80	339.50	4,489.83	142.20	-125.08	-121.14	1.22	0.00	-12.11

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Coordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Site:	Emerald PWU 20-22	MD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Well:	12H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/S (usft)	+E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,594.00	5.30	338.80	4,585.38	150.88	-128.38	-124.20	0.53	-0.52	-0.73
4,689.00	5.10	339.50	4,679.99	158.92	-131.45	-127.04	0.22	-0.21	0.74
4,785.00	5.40	339.70	4,775.59	167.16	-134.51	-129.88	0.31	0.31	0.21
4,881.00	4.90	339.00	4,871.20	175.22	-137.55	-132.69	0.52	-0.52	-0.73
4,976.00	4.70	342.50	4,965.86	182.72	-140.17	-135.11	0.37	-0.21	3.68
5,072.00	4.50	346.20	5,061.56	190.13	-142.25	-136.99	0.37	-0.21	3.85
5,168.00	4.80	338.80	5,157.24	197.53	-144.60	-139.14	0.70	0.31	-7.71
5,263.00	5.50	343.10	5,251.86	205.59	-147.36	-141.67	0.84	0.74	4.53
5,359.00	5.30	344.50	5,347.43	214.27	-149.88	-143.96	0.25	-0.21	1.46
5,454.00	4.80	353.20	5,442.06	222.44	-151.53	-145.38	0.96	-0.53	9.16
5,550.00	5.50	348.10	5,537.68	230.93	-152.95	-146.57	0.87	0.73	-5.31
5,645.00	5.80	340.20	5,632.22	239.90	-155.52	-148.89	0.88	0.32	-8.32
5,741.00	5.30	339.50	5,727.76	248.62	-158.71	-151.84	0.53	-0.52	-0.73
5,836.00	4.70	342.90	5,822.40	256.45	-161.39	-154.31	0.70	-0.63	3.58
5,932.00	4.60	342.00	5,918.09	263.87	-163.74	-156.45	0.13	-0.10	-0.94
6,027.00	5.50	336.50	6,012.72	271.67	-166.73	-159.23	1.07	0.95	-5.79
6,123.00	5.00	336.20	6,108.31	279.72	-170.26	-162.53	0.52	-0.52	-0.31
6,218.00	4.90	339.20	6,202.96	287.30	-173.37	-165.43	0.29	-0.11	3.16
6,314.00	6.00	339.70	6,298.53	295.84	-176.56	-168.39	1.15	1.15	0.52
6,410.00	5.50	340.90	6,394.04	304.89	-179.81	-171.39	0.54	-0.52	1.25
6,505.00	4.50	338.50	6,488.68	312.66	-182.67	-174.03	1.08	-1.05	-2.53
6,601.00	4.70	336.90	6,584.37	319.78	-185.59	-176.76	0.25	0.21	-1.67
6,696.00	5.70	340.80	6,678.98	327.82	-188.67	-179.61	1.12	1.05	4.11
6,792.00	6.10	342.30	6,774.47	337.18	-191.79	-182.48	0.45	0.42	1.56
6,887.00	5.30	339.40	6,869.00	346.09	-194.86	-185.31	0.89	-0.84	-3.05
6,983.00	4.90	336.40	6,964.62	354.00	-198.07	-188.29	0.50	-0.42	-3.13
7,079.00	5.50	337.10	7,060.22	362.00	-201.50	-191.50	0.63	0.63	0.73
7,174.00	6.10	336.40	7,154.74	370.81	-205.29	-195.05	0.64	0.63	-0.74
7,269.00	5.50	332.50	7,249.25	379.48	-209.41	-198.94	0.76	-0.63	-4.11
7,365.00	4.70	336.00	7,344.87	387.15	-213.14	-202.45	0.89	-0.83	3.65
7,461.00	3.70	326.40	7,440.61	393.33	-216.45	-205.59	1.27	-1.04	-10.00
7,556.00	3.30	341.60	7,535.44	398.47	-219.01	-208.01	1.06	-0.42	16.00
7,651.00	3.70	344.60	7,630.26	404.02	-220.69	-209.53	0.46	0.42	3.16
7,746.00	2.50	337.40	7,725.12	408.89	-222.30	-211.01	1.33	-1.26	-7.58
7,842.00	3.10	347.80	7,821.00	413.36	-223.65	-212.24	0.82	0.63	10.83
7,938.00	2.60	354.30	7,916.89	418.07	-224.42	-212.88	0.62	-0.52	6.77
8,033.00	2.20	356.40	8,011.80	422.03	-224.74	-213.10	0.43	-0.42	2.21
8,119.00	5.90	150.70	8,097.68	419.82	-222.68	-211.10	9.23	4.30	179.42
8,151.00	8.00	144.90	8,129.44	416.56	-220.60	-209.10	6.91	6.56	-18.13
8,248.00	8.80	144.93	8,225.40	404.97	-212.45	-201.28	0.82	0.82	0.03
8,344.00	8.20	145.43	8,320.35	393.32	-204.35	-193.49	0.63	-0.63	0.52
8,439.00	8.13	145.54	8,414.38	382.20	-196.70	-186.16	0.08	-0.07	0.12
8,535.00	12.07	124.41	8,508.91	370.92	-184.57	-174.34	5.57	4.10	-22.01
8,583.00	18.08	115.08	8,555.24	364.93	-173.67	-163.61	13.46	12.52	-19.44

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Coordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Site:	Emerald PWU 20-22	MD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Well:	12H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	Database:	EDM 5000.1 Multi User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,631.00	21.97	101.63	8,600.36	359.95	-158.12	-148.20	12.51	8.10	-28.02
8,679.00	27.38	90.89	8,643.98	357.97	-138.26	-128.40	14.60	11.27	-22.38
8,726.00	32.64	85.41	8,684.67	358.82	-114.80	-104.93	12.61	11.19	-11.66
8,774.00	39.00	82.00	8,723.58	361.96	-86.91	-76.96	13.88	13.25	-7.10
8,822.00	45.51	83.74	8,759.09	365.93	-54.90	-44.85	13.78	13.56	3.63
8,870.00	52.02	88.16	8,790.72	368.41	-18.92	-8.82	15.22	13.56	9.21
8,918.00	55.74	90.32	8,819.01	368.91	19.84	29.94	8.56	7.75	4.50
8,966.00	59.72	90.14	8,844.63	368.74	60.41	70.49	8.30	8.29	-0.38
9,013.00	63.50	89.60	8,866.98	368.84	101.75	111.82	8.11	8.04	-1.15
9,061.00	66.76	90.22	8,887.16	368.91	145.29	155.35	6.89	6.79	1.29
9,109.00	69.44	90.95	8,905.06	368.45	189.82	199.85	5.76	5.58	1.52
9,157.00	70.99	90.96	8,921.31	367.70	234.98	244.97	3.23	3.23	0.02
9,205.00	73.19	91.17	8,936.07	366.85	280.65	290.59	4.60	4.58	0.44
9,253.00	77.87	91.21	8,948.06	365.88	327.10	337.00	9.75	9.75	0.08
9,300.00	81.44	91.36	8,956.50	364.85	373.32	383.17	7.60	7.60	0.32
9,392.00	87.10	91.28	8,965.68	362.74	464.80	474.56	6.15	6.15	-0.09
9,487.00	90.07	93.01	8,968.03	359.18	559.69	569.32	3.62	3.13	1.82
9,583.00	90.40	92.30	8,967.63	354.74	655.58	665.06	0.82	0.34	-0.74
9,679.00	90.72	92.04	8,966.69	351.10	751.51	760.85	0.43	0.33	-0.27
9,774.00	89.89	92.79	8,966.19	347.10	846.42	855.61	1.18	-0.87	0.79
9,870.00	89.17	93.03	8,966.98	342.22	942.29	951.32	0.79	-0.75	0.25
9,965.00	89.63	92.75	8,967.97	337.43	1,037.17	1,046.02	0.57	0.48	-0.29
10,061.00	89.36	92.52	8,968.82	333.02	1,133.06	1,141.76	0.37	-0.28	-0.24
10,157.00	88.21	92.11	8,970.85	329.14	1,228.96	1,237.52	1.27	-1.20	-0.43
10,252.00	88.69	91.63	8,973.42	326.05	1,323.87	1,332.31	0.71	0.51	-0.51
10,348.00	88.65	89.59	8,975.65	325.02	1,419.84	1,428.21	2.12	-0.04	-2.13
10,444.00	87.56	88.10	8,978.83	326.96	1,515.76	1,524.15	1.92	-1.14	-1.55
10,539.00	89.29	87.80	8,981.44	330.35	1,610.66	1,619.11	1.85	1.82	-0.32
10,635.00	90.23	87.23	8,981.84	334.52	1,706.57	1,715.09	1.15	0.98	-0.59
10,730.00	89.86	88.71	8,981.76	337.88	1,801.51	1,810.09	1.61	-0.39	1.56
10,826.00	90.57	88.71	8,981.40	340.04	1,897.48	1,906.08	0.74	0.74	0.00
10,922.00	90.55	88.92	8,980.47	342.03	1,993.46	2,002.08	0.22	-0.02	0.22
11,018.00	90.35	90.28	8,979.71	342.70	2,089.45	2,098.05	1.43	-0.21	1.42
11,113.00	89.25	90.80	8,980.04	341.80	2,184.44	2,192.99	1.28	-1.16	0.55
11,209.00	88.87	89.17	8,981.62	341.83	2,280.42	2,288.93	1.74	-0.40	-1.70
11,304.00	89.69	88.98	8,982.81	343.36	2,375.40	2,383.92	0.89	0.86	-0.20
11,400.00	91.02	88.87	8,982.22	345.16	2,471.38	2,479.91	1.39	1.39	-0.11
11,496.00	89.77	89.92	8,981.56	346.18	2,567.37	2,575.89	1.70	-1.30	1.09
11,591.00	88.31	88.81	8,983.15	347.23	2,662.35	2,670.86	1.93	-1.54	-1.17
11,687.00	89.09	88.81	8,985.32	349.22	2,758.30	2,766.84	0.81	0.81	0.00
11,782.00	88.99	89.88	8,986.92	350.31	2,853.28	2,861.81	1.13	-0.11	1.13
11,878.00	88.64	90.74	8,988.90	349.79	2,949.26	2,957.74	0.97	-0.36	0.90
11,974.00	88.73	90.95	8,991.11	348.37	3,045.22	3,053.62	0.24	0.09	0.22

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Coordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Site:	Emerald PWU 20-22	MD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Well:	12H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	Database:	EDM 5000.1 Multi User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,069.00	89.03	90.17	8,992.96	347.45	3,140.20	3,148.54	0.88	0.32	-0.82
12,165.00	89.81	90.03	8,993.93	347.28	3,236.19	3,244.49	0.83	0.81	-0.15
12,260.00	89.76	89.75	8,994.29	347.46	3,331.19	3,339.46	0.30	-0.05	-0.29
12,356.00	91.02	89.94	8,993.64	347.72	3,427.19	3,435.43	1.33	1.31	0.20
12,451.00	90.12	90.12	8,992.69	347.67	3,522.18	3,530.39	0.97	-0.95	0.19
12,547.00	89.26	89.85	8,993.21	347.70	3,618.18	3,626.35	0.94	-0.90	-0.28
12,642.00	88.35	90.11	8,995.19	347.73	3,713.16	3,721.29	1.00	-0.96	0.27
12,738.00	89.77	89.46	8,996.77	348.09	3,809.14	3,817.25	1.63	1.48	-0.68
12,834.00	89.60	90.59	8,997.30	348.05	3,905.14	3,913.21	1.19	-0.18	1.18
12,929.00	89.39	90.75	8,998.13	346.94	4,000.13	4,008.13	0.28	-0.22	0.17
13,025.00	88.57	89.77	8,999.84	346.50	4,096.11	4,104.07	1.33	-0.85	-1.02
13,120.00	88.81	88.41	9,002.01	348.01	4,191.07	4,199.03	1.45	0.25	-1.43
13,216.00	89.99	88.31	9,003.02	350.76	4,287.03	4,295.03	1.23	1.23	-0.10
13,311.00	90.71	88.81	9,002.44	353.14	4,381.99	4,390.02	0.92	0.76	0.53
13,407.00	91.75	90.49	9,000.38	353.73	4,477.96	4,485.97	2.06	1.08	1.75
13,502.00	91.00	91.09	8,998.10	352.42	4,572.93	4,580.87	1.01	-0.79	0.63
13,598.00	89.18	91.24	8,997.95	350.47	4,668.90	4,676.75	1.90	-1.90	0.16
13,693.00	88.57	89.60	8,999.81	349.77	4,763.88	4,771.67	1.84	-0.64	-1.73
13,784.00	89.59	89.03	9,001.27	350.86	4,854.86	4,862.65	1.28	1.12	-0.63
13,876.00	89.15	89.86	9,002.29	351.75	4,946.85	4,954.63	1.02	-0.48	0.90
13,968.00	89.03	88.92	9,003.75	352.73	5,038.83	5,046.60	1.03	-0.13	-1.02
14,060.00	89.77	89.33	9,004.71	354.14	5,130.81	5,138.59	0.92	0.80	0.45
14,151.00	89.33	90.21	9,005.42	354.50	5,221.81	5,229.56	1.08	-0.48	0.97
14,243.00	89.45	90.50	9,006.40	353.93	5,313.80	5,321.50	0.34	0.13	0.32
14,334.00	90.35	90.86	9,006.56	352.85	5,404.79	5,412.43	1.07	0.99	0.40
14,426.00	90.73	91.71	9,005.70	350.79	5,496.76	5,504.31	1.01	0.41	0.92
14,518.00	90.38	91.83	9,004.80	347.95	5,588.72	5,596.15	0.40	-0.38	0.13
14,609.00	89.07	91.33	9,005.24	345.44	5,679.68	5,687.01	1.54	-1.44	-0.55
14,701.00	87.96	90.50	9,007.63	343.97	5,771.63	5,778.89	1.51	-1.21	-0.90
14,792.00	87.78	90.93	9,011.01	342.83	5,862.56	5,869.76	0.51	-0.20	0.47
14,883.00	87.26	89.23	9,014.95	342.71	5,953.47	5,960.63	1.95	-0.57	-1.87
14,974.00	86.82	89.46	9,019.64	343.75	6,044.35	6,051.50	0.55	-0.48	0.25
15,070.00	87.80	89.28	9,024.15	344.80	6,140.23	6,147.38	1.04	1.02	-0.19
15,165.00	89.16	88.44	9,026.67	346.69	6,235.18	6,242.34	1.68	1.43	-0.88
15,261.00	90.66	89.08	9,026.82	348.77	6,331.15	6,338.33	1.70	1.56	0.67
15,356.00	91.09	89.44	9,025.37	349.99	6,426.13	6,433.31	0.59	0.45	0.38
15,452.00	91.48	89.88	9,023.22	350.56	6,522.11	6,529.26	0.61	0.41	0.46
15,549.00	91.65	90.18	9,020.57	350.51	6,619.07	6,626.19	0.36	0.18	0.31
15,644.00	92.08	90.41	9,017.48	350.02	6,714.02	6,721.09	0.51	0.45	0.24
15,739.00	90.39	90.91	9,015.43	348.93	6,808.99	6,815.99	1.86	-1.78	0.53
15,835.00	90.49	91.36	9,014.69	347.03	6,904.97	6,911.88	0.48	0.10	0.47
15,931.00	89.94	90.13	9,014.33	345.78	7,000.95	7,007.80	1.40	-0.57	-1.28
16,026.00	89.38	88.46	9,014.90	346.95	7,095.94	7,102.78	1.85	-0.59	-1.76

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Coordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Site:	Emerald PWU 20-22	MD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Well:	12H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	Database:	EDM 5000.1 Multi User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,122.00	89.74	89.14	9,015.63	348.96	7,191.92	7,198.78	0.80	0.38	0.71
16,217.00	89.98	89.45	9,015.86	350.13	7,286.91	7,293.77	0.41	0.25	0.33
16,313.00	90.36	89.52	9,015.58	350.99	7,382.90	7,389.75	0.40	0.40	0.07
16,409.00	89.13	89.82	9,016.01	351.54	7,478.90	7,485.72	1.32	-1.28	0.31
16,504.00	87.75	88.75	9,018.59	352.73	7,573.85	7,580.67	1.84	-1.45	-1.13
16,600.00	88.46	89.04	9,021.77	354.58	7,669.78	7,676.62	0.80	0.74	0.30
16,695.00	88.14	88.35	9,024.59	356.74	7,764.72	7,771.58	0.80	-0.34	-0.73
16,791.00	89.35	88.77	9,026.69	359.15	7,860.66	7,867.55	1.33	1.26	0.44
16,886.00	90.40	88.86	9,026.90	361.12	7,955.64	7,962.55	1.11	1.11	0.09
16,982.00	91.10	89.46	9,025.64	362.52	8,051.62	8,058.53	0.96	0.73	0.63
17,078.00	91.28	89.91	9,023.65	363.05	8,147.60	8,154.48	0.50	0.19	0.47
17,173.00	91.19	91.35	9,021.60	362.01	8,242.57	8,249.39	1.52	-0.09	1.52
17,269.00	91.38	91.85	9,019.44	359.33	8,338.50	8,345.22	0.56	0.20	0.52
17,364.00	90.74	92.58	9,017.69	355.66	8,433.42	8,439.99	1.02	-0.67	0.77
17,460.00	89.76	92.56	9,017.27	351.35	8,529.32	8,535.74	1.02	-1.02	-0.02
17,556.00	88.81	91.73	9,018.47	347.76	8,625.24	8,631.53	1.31	-0.99	-0.86
17,651.00	87.99	90.85	9,021.12	345.62	8,720.18	8,726.37	1.27	-0.86	-0.93
17,747.00	88.35	90.18	9,024.18	344.76	8,816.12	8,822.26	0.79	0.38	-0.70
17,842.00	88.76	90.47	9,026.58	344.22	8,911.09	8,917.18	0.53	0.43	0.31
17,936.00	87.69	87.64	9,029.49	345.77	9,005.02	9,011.12	3.22	-1.14	-3.01
18,031.00	89.38	88.06	9,031.92	349.33	9,099.92	9,106.08	1.83	1.78	0.44
18,126.00	89.72	88.26	9,032.67	352.38	9,194.87	9,201.07	0.42	0.36	0.21
18,221.00	90.07	88.69	9,032.84	354.91	9,289.84	9,296.07	0.58	0.37	0.45
18,316.00	90.86	90.38	9,032.07	355.68	9,384.83	9,391.05	1.96	0.83	1.78
18,411.00	91.25	90.45	9,030.32	354.99	9,479.81	9,485.97	0.42	0.41	0.07
18,505.00	91.53	90.70	9,028.04	354.05	9,573.77	9,579.88	0.40	0.30	0.27
18,600.00	91.15	90.50	9,025.82	353.06	9,668.74	9,674.79	0.45	-0.40	-0.21
18,695.00	90.35	90.57	9,024.58	352.17	9,763.73	9,769.71	0.85	-0.84	0.07
18,790.00	90.47	90.84	9,023.90	351.00	9,858.72	9,864.64	0.31	0.13	0.28
18,884.00	89.28	91.00	9,024.10	349.49	9,952.71	9,958.54	1.28	-1.27	0.17
18,979.00	89.29	90.88	9,025.29	347.93	10,047.69	10,053.45	0.13	0.01	-0.13
19,074.00	88.59	89.97	9,027.04	347.23	10,142.66	10,148.37	1.21	-0.74	-0.96
19,168.00	88.58	89.38	9,029.37	347.76	10,236.63	10,242.32	0.63	-0.01	-0.63
19,262.00	88.52	89.74	9,031.74	348.48	10,330.60	10,336.27	0.39	-0.06	0.38
19,357.00	88.36	89.67	9,034.33	348.97	10,425.56	10,431.21	0.18	-0.17	-0.07
19,452.00	88.64	89.27	9,036.82	349.85	10,520.53	10,526.16	0.51	0.29	-0.42
19,547.00	89.35	89.28	9,038.48	351.05	10,615.51	10,621.14	0.75	0.75	0.01
19,641.00	89.95	88.96	9,039.06	352.50	10,709.49	10,715.13	0.72	0.64	-0.34
19,737.00	90.45	88.89	9,038.72	354.30	10,805.47	10,811.12	0.53	0.52	-0.07
19,832.00	90.08	89.82	9,038.28	355.37	10,900.47	10,906.11	1.05	-0.39	0.98
19,926.00	89.35	90.03	9,038.75	355.49	10,994.46	11,000.08	0.81	-0.78	0.22
20,022.00	89.38	89.96	9,039.81	355.50	11,090.46	11,096.03	0.08	0.03	-0.07
20,117.00	89.53	90.09	9,040.72	355.46	11,185.45	11,190.99	0.21	0.16	0.14
20,211.00	89.78	90.24	9,041.28	355.18	11,279.45	11,284.95	0.31	0.27	0.16

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Coordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Site:	Emerald PWJ 20-22	MD Reference:	3313.8' GE + 23.5' KB @ 3337.30usft
Well:	12H	North Reference:	Grid
Wellbore:	ST01	Survey Calculation Method:	Minimum Curvature
Design:	ST01	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
20,306.00	89.99	90.26	9,041.47	354.77	11,374.45	11,379.90	0.22	0.22	0.02
20,401.00	88.78	90.10	9,042.49	354.47	11,469.44	11,474.85	1.28	-1.27	-0.17
20,496.00	88.95	90.04	9,044.38	354.36	11,564.42	11,569.79	0.19	0.18	-0.06
20,591.00	89.22	90.27	9,045.89	354.10	11,659.41	11,664.74	0.37	0.28	0.24
20,686.00	89.49	90.61	9,046.96	353.37	11,754.40	11,759.67	0.46	0.28	0.36
20,780.00	89.66	90.54	9,047.66	352.43	11,848.39	11,853.60	0.20	0.18	-0.07
20,875.00	88.49	90.35	9,049.19	351.69	11,943.38	11,948.53	1.25	-1.23	-0.20
20,969.00	88.57	90.17	9,051.61	351.26	12,037.35	12,042.45	0.21	0.09	-0.19
21,063.00	88.92	90.45	9,053.66	350.75	12,131.32	12,136.38	0.48	0.37	0.30
21,158.00	89.17	90.59	9,055.25	349.89	12,226.30	12,231.30	0.30	0.26	0.15
21,252.00	89.70	90.97	9,056.17	348.61	12,320.29	12,325.22	0.69	0.56	0.40
21,346.00	90.25	91.27	9,056.22	346.77	12,414.27	12,419.11	0.67	0.59	0.32
21,442.00	90.83	91.85	9,055.31	344.16	12,510.23	12,514.96	0.85	0.60	0.60
21,536.00	91.30	92.01	9,053.56	341.00	12,604.16	12,608.77	0.53	0.50	0.17
21,600.00	91.34	92.02	9,052.09	338.75	12,668.11	12,672.63	0.06	0.06	0.02
21,664.23	91.34	92.02	9,050.59	336.48	12,732.27	12,736.71	0.00	0.00	0.00
PBHL (Emerald 12H ST01)									
21,670.00	91.34	92.02	9,050.45	336.28	12,738.04	12,742.47	0.00	0.00	0.00

Checked By: _____ Approved By: _____ Date: _____